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AUTHOR Lynch, Mervin; Cochran, Teresa
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DEVELOPMENT AND VALIDATION OF A SET OF SEMANTIC DIFFERENTIAL SCALES FOR CHILDREN

Mervin Lynch
Northeastern University

Teresa Cochran
Boston College

At the present time, only a small number of studies have been reported using the semantic differential with children. Most of these employed the scales developed for adults (Ervin & Foster, 1960; Long, Henderson, & Liller, 1968; Maltz, 1963; Small, 1957). It is questionable whether they are valid for children whose reading and vocabulary level is considerably below that of adults. Only one series of studies has been found which attempted to establish a set of scales valid for children (DiVesta, 1964, 1965, 1966). These scales were selected from the verbal results of a free association task. The author, DiVesta, was primarily interested in generating terms from children's psycho-linguistic associations. As a result, his scales differed from adult scales in that they weren't necessarily polar opposites, and in that they weren't used as modifiers to make judgments or ratings.

It was the purpose of the present study to develop and refine a set of scales for children which would be an improvement over these earlier ones. The important features for selection of the new scales were, one, their suitability

to children's level of vocabulary, and two, their representativeness as a sample of children's total vocabulary set.

The potential uses of a series of scales for children are plentiful. Of primary interest is the study of developmental changes in meaning systems. One might suspect, for example, that meaning would develop from simple to more complex structures in a similar manner to general language and skill development (Bruner, 1967; Piaget, 1932). Osgood and Tannenbaum (1955) suggest a trend toward maximal simplicity in judgment. That is, people move from more complex to simpler all-or-none judgments along the evaluative dimension. Further, they suggest that such a trend will be stronger in young than in older children. This increase in complexity might be reflected in semantic differential results by an increase with age in the number of factors associated with a particular concept.

Preliminary evidence is contradictory. A recent study by DiVesta and Stauber (1971) with preschool children suggests progressive differntiation in growth of the child's cognitive and affective behavior. Other investigators have also found developmental changes in connotative meaning with elementary school children(Ervin & Foster, 1960; Long et al, 1968;Maltz, 1963). On the other hand, both Asgood, Archer, and Miron (1962) and DiVesta (1966) have evidence that connotative meaning stabilizes by the second grade level.

In the present study, a unique set of scales were developed for measuring children's connotative meaning. The first step was to examine the validity of the instrument by providing factorial cross-validation. Then, the factors were examined for ontogenetic differences. For this, comparisons were made across grade levels. Finally, comparisons were made across sexes. This latter comparison had been previously made by Long et al (1968) who extracted a unique factor for males which may be interpreted as potency.

Methods and Procedures

Selection of Scales: A pool of 360 adjective pairs was generated by 36 graduate students, some whom were elementary school teachers. The criteria used were that the pairs be polar opposites, that they be geared to the reading level of at least second grade, that a child be able to distinquish between the two adjectives along a continuum, and that they represent known factors of connotative meaning derived from previous semantic differential research. Those pairs were selected which received a rating of seven or above through a screening process in which the students were asked to rate the original set on a scale of one to ten bearing the above criteria in mind. The final set consisted of 55 adjective pairs which seemed independent of each other and seemed to represent several different dimensions of meaning.

Selection of Concepts: The concept, "myself," was selected as the concept to be rated on the set of 55 scales. This was chosen since it is a general concept that should elicit

a wide range of judgments.

Selection of Continuum: A five-point scale was selected since preliminary research indicates that children fail to use some of the degrees on a seven point scale.(Long et al, 1968; Maltz, 1963)

Preparation of stimulus materials: The stimulus materials for the rating procedure were presented in a booklet with the concept "myself" appearing at the top of each of the three pages required for the 55 scales. The degrees along the five-point continuum were labelled "very," "only a bit," "in between," "only a bit," and "very." The scales were alternated with respect to theoretical dimensionality and the poles were rotated using a triple alernation of ends to prevent scale checking bias.

TABLE 1

Original 55 Semantic Scales

MYSELF

	very	only a bit	in betwen	only a bit	very	
shy	___	_____	_____	_____	_____	bold
fun	___	_____	_____	_____	_____	not fun

like boys, like girls
wise, foolish
hard to get to know, easy to get to know
mean, kind
true, false
not safe, safe
not real, real
friendly, not friendly
good looking, bad looking

not funny, funny
warm, cool
honest, not honest
wild, tame
angry, not angry
dull, sharp
clean, dirty
fast, slow
soft, hard
rich, poor
old, young
eager, not eager
weak, strong
fair, not fair
noisy, quiet
fancy, plain
neat, sloppy
sour, sweet
exciting, not exciting
sad, happy
greedy, not greedy
not busy, busy
smart, dumb
liked, not liked
light, heavy
old, young
playful, not playful
nice, naughty
loving, not loving
not brave, brave
shiny, dull
hard, easy
often right, often wrong
afraid, not afraid
pretty, ugly
hot, cold
dry, wet
not silly, silly
polite, not polite
light, dark
bad, good
cheerful, grumpy
careless, careful
sure, not sure
believable, not believable

Subjects: Two hundred sixteen elementary school children were selected on a quota sampling basis. Each of thirty-six graduate students selected one male and one female subject at the second, fourth, and sixth grade levels. The final sample consisted of 36 males and 36 females at each grade level.

Design: The design was a three by two with levels of grade and sex. The levels of grade were second, fourth, and sixth.

Testing procedure: Since a large number of test administrators were used, standardized written instructions were given by all examiners. The purpose of the instructions was to introduce the task and clarify it for the child. For these purposes concepts of "Big Bad Wolf" and "Snoopy" were used with five semantic differential scales. These examples were used to teach the subjects the technique of rating and permitted the examiner to determine whether the subject understood the task. The subject was then asked to rate the concept, "Myself." No additional help was given the subjects. In general the subjects learned the technique quickly. The time required to complete the 55 scales of the concept, "Myself," ranged from five to twenty minutes.

Analysis procedures: Factor analyses were made on the overall sample and on each of the sex and grade level marginals to provide cross-validation. Least square transforms were done between these factors to provide a means of comparing the factor structures of the sexes and of each possible pair of grade levels.

Results

Three factors emerged for the overall group. These were labelled personal evaluation, personalized activity, and mood. Factor 1, personal evaluation, accounted for 14.7% of the common variance and was characterized by scales such as mean-kind and false-true. Factor 2, personalized activity, accounted for 7.48% of the common variance and was characterized by scales such as poor-rich and ugly-pretty. Factor 3, mood, accounted for 8.58% of the common variance and was characterized by scales such as noisy-quiet and silly-not silly.

Six factors emerged for the second grade level. These were labelled moral evaluation, personal potency, tidiness, personal evaluation, disposition, and general potency. Fact 1, moral evaluation, accounted for 16.06% of the common variance and was characterized by scales such as false-true and not safe-safe. Factor 2, personal potency, accounted for 7.65% of the common variance and was characterized by scales such as dull-sharp and slow-fast.

Factor 3, tidiness, accounted for 4.81% of the common variance and was characterized by scales such as sloppy-neat and ugly-pretty. Factor 4, personal evaluation, accounted for 9.22% of the common variance and was characterized by scales such as fun-not fun and foolish-wise. Factor 5, disposition, accounted for 4.46% of the common variance and was characterized by scales such as sour-sweet and fair-unfair. Factor 6,

general potency, accounted for 5.16% of the common variance and was characterized by scales such as warm-cool and soft-hard.

Seven factors emerged for the fourth grade level. These were labelled personal evaluation, charisma, tidiness, general potency, general evaluation, personal potency, and hero. Factor 1, personal evaluation, accounted for 12.04% of the common variance and was characterized by scales such as fun-not fun and mean-kind. Factor 2, charisma, accounted for 8.58% of the common variance and was characterized by scales such as fast-slow and weak-strong. Factor 3, tidiness, accounted for 7.67% of the common variance and was characterized by scales such as clean-dirty and noisy-quiet.

Factor 4, general potency, accounted for 5.38% of the common variance and was characterized by scales such as wise-foolish and warm-cool. Factor 5, general evaluation, accounted for 6.27% of the common variance and was characterized by scales such as greedy-not greedy and good-bad. Factor 6, personal potency, accounted for 5.82% of the common variance and was characterized by scales such as exciting-not exciting and easy-hard. Factor 7, hero, accounted for 4.20% of the common variance and was characterized by scales such as soft-hard and brave-not brave.

Seven factors emerged for the sixth grade level. These were labelled personal evaluation, moral evaluation, personal potency, personal appearance, general potency, charisma, and

reticence. Factor 1, personal evaluation, accounted for 10.40% of the common variance and was characterized by scales such as real-not real and friendly-not friendly. Factor 2, moral evaluation, accounted for 7.26% of the common variance and was characterized by scales such as wise-foolish and noisy-quiet. Factor 3, personal potency, accounted for 6.83% of the common variance and was characterized by scales such as brave-not brave and afraid-not afraid.

Factor 4, personal appearance, accounted for 6.42% of the common variance was was characterized by scales such as good looking-bad looking and pretty-ugly. Factor 5, general potency, accounted for 4.43% of the common variance and was characterized by scales such as like boys-like girls and liked-not liked. Factor 6, charisma, accounted for 8.50% of the common variance and was characterized by scales such as fun-not fun and fair-not fair. Factor 7, reticence, accounted for 5.39% of the common variance and was characterized by scales such as often right-often wrong and loving-not loving.

Four identifiable factors emerged for males. These were labelled moral evaluation, general potency, personal appearance, and general activity. Factor 1, moral evaluation, accounted for 18.26% of the common variance and was characterized by scales such as careful-careless and believable-not believable. Factor 2, general potency, accounted for 5.52% of the common

variance and was characterized by scales such as eager-not eager and weak-strong. Factor 3, personal appearance, accounted for 8.13% of the common variance and was characterized by scales such as clean-dirty and neat-sloppy. Factor 4, general activity, accounted for 5.93% of the common variance and was characterized by scales such as exciting-not exciting and silly-not silly.

Four identifiable factors emerged for females. These were labelled personal evaluation, vanity, mood, and self-confidence. Factor 1, personal evaluation, accounted for 11.41% of the common variance and was characterized by scales such as real-not real and friendly-not friendly. Factor 2, vanity, accounted for 8.36% of the common variance and was characterized by scales such as shy-bold and liked-not liked. Factor 3, mood, accounted for 5.53% of the common variance and was characterized by scales such as playful-not playful and wild-tame. Factor 4, self-confidence, accounted for 9.94% of the common variance and was characterized by scales such as sure-not sure and easy to get to know-hard to get to know.

The least square transform for grades two and four, which is presented in Table 2, resulted in the identification of four dimensions of connotative meaning. These were labelled personal evaluation, personalism, moral evaluation, and charisma. A unique hero factor was identified for grade four and two unique factors were identified for grade two, general disposition and general potency.

Table 2
Least Square Transform
for Grades Two and Four

Grade 4

	personal evaluation	charisma	tidiness	general potency	general evaluation	personal potency	hero
Moral evaluation	.63	-.09	-.20	-.40	-.37	.34	.61
personal potency	-.16	-.45	-.00	-.30	-.13	.11	.31
tidiness	-.10	-.37	-.36	-.11	.17	.05	.15
personal evaluation	-.22	-.28	-.24	-.31	.08	.15	.01
disposition	-.02	-.06	.03	-.10	.05	.05	.10
general potency	-.05	-.11	.08	.00	.21	.03	.04

The least square transform for grades four and six, is presented in Table 3. Three dimensions were identified as personal evaluation, tidiness, and general evaluation. Three unique factors were identified for grade four, general potency, general evaluation, and personal potency. Three unique factors were identified for grade six. These were personal potency, general potency, and reticence.

Table 3
Least Square Transform
for Grades Four and Six

Grade 6

	personal evaluation	moral evaluation	personal potency	personal appearance	general potency	charisma	reticence
personal evaluation	-.50	-.06	.27	.13	.13	-.30	.15
charisma	-.06	-.07	-.09	.37	.11	.33	-.28
tidiness	.05	.44	-.06	.29	.05	-.00	-.02
general potency	.26	-.07	-.12	.03	.24	.07	-.01
general evaluation	.13	.21	-.08	.16	-.24	.23	.06
personal potency	-.22	-.22	-.06	-.20	-..10	-.05	.13
hero	-.42	.19	.25	.21	-.10	-.24	-.14

The lease square transform for grades two and six, which is presented in Table 4, resulted in the identification of four dimensions. These were labelled personal evaluation, charisma, general evaluation, and general potency. A unique general disposition factor was found for grade two and a unique reticence factor was found for grade six.

Table 4
Least square Transform
for Grades Two and Six

Grade 6

	personal evaluation	moral evaluation	personal potency	personal appearance	general potency	charisma	reti-cence
moral evaluation	-.52	.36	.12	-.15	.11	-.18	.20
personal potency	-.02	.12	.18	-.04	-.10	-.32	.06
tidiness	.18	-.13	.05	.35	-.39	-.06	.06
personal evaluation	.22	-.14	.06	-.13	-.12	-.38	.16
disposition	.06	-.13	-.19	-.10	-.02	.18	-.09
general potency	.11	-.39	-.39	.28	-.35	-.08	.27

The least square solution for males and females provided three dimensions, personal appearance, mood, and personal evaluation. A unique general potency factor was identified for males. These data are presented in Table 5.

Table 5
Least Square Transform
For Males and Females

Females

	personal evaluation	vanity	mood	self-confidence
moral evaluation	.56	.13	.13	.50
general potency	-.17	-.26	.19	.05
personal appearance	.12	-.57	.16	.31
general activity	.40	-.03	.46	.06

Common scales. The selection of the final set of nineteen scales was made on the basis that the scale be common to two or more of four principal dimensions identified by means of the least square comparisons, that is those which showed up in various but not all least square comparisons. The dimensions and the final set of scales are presented in Table 6.

Table 6

Final Dimensions and Common Scales

Personal Evaluation	Personal Appearance
loving-not loving	pretty-ugly
safe-not safe	noisy-quiet
happy-sad	neat-sloppy
believable-not believable	good looking-bad looking
friendly-not friendly	clean-dirty
liked-not liked	
real-not real	
Charisma	**Dynamism**
good-bad	fast-slow
cheerful-grumpy	strong-weak
funny-not funny	
silly-not silly	

Discussion

Three factors were extracted from the factor analysis of the overall but six factors were extracted for the second grade and seven factors each for the fourth and sixth grades. Combining grade levels apparently averages out interactive variance present between grades and sex, and obscures the relative degree of complexity of factor structure. In most semantic differential research, factor analysis has been undertaken on over-

all totals for sample data which may have systematically obscured variability due to individual differences.. Perhaps separate factor analyses should be done on semantic differential data for various population densitites, rather than for the entire sample in order to clearly show what sources of variability are present.

In examining the data for ontogenetic differences across grade levels, there appears to be little increase in complexity even with the stringent eigenvalue cutoff of 2.0 for factors. What is revealed, however, is that new factors are substituted for old ones and that a change in the nature of factors is shown across grade levels. It may be that the new factors emerging for the fourth and sixth grade levels are semantically more complex than those for the second grade level or it may be that the substitution of new factors for old ones was erroneously identified as an increase in complexity.

A comparison of male and female responses reveals a unique potency factor for males. This is consistent with the findings of Long and his associates (1968). The potency construct of the semantic differential should not be confused with the Freudian concept of instrumental potency (Hall, 1954). At the same time, the fact that potency judgments were made by boys and not girls would lead to a parsimonious explanation in terms of Freudian notions of potency.

A six factor structure for elementary school children has not been previously reported in the literature and is indicative

of a greater degree of judgmental complexity than has generally been suggested. The findings may be due, in part, to the method of scale selection employed and to the number of scales used. DiVesta (1966) reported finding a three-factor structure, evaluation, potency, and activity, in elementary school children. DiVesta used a semantic differential designed with twenty concepts and thirty-seven scales. His findings may have been the result of the method of scale selection and the type of scales employed, that is, the scales were more indicative of those obtained by free association than ones representative from the available sampling of polar opposites at the vocabulary level of elementary grade level children.

Conclusions

The study has provided a new set of scales which seem to represent a sampling of those adjectives which elementary grade level children use in making judgments such as are required by the semantic differntial. The study revealed a more complex judgmental structure in second grade level children than has previously been reported. Although increasing complexity was not seen across grade levels, a change in the nature of factors was shown.

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